

1.	Field of study	Physics
2.	Faculty	Faculty of Science and Technology
3.	Academic year of entry	2025/2026 (winter term)
4.	Level of qualifications/degree	second-cycle studies
5.	Degree profile	general academic
6.	Mode of study	full-time

7.	General information about the module	
Module name		Laboratory Training
Module code		W4-FZ-NM-S2-2-22-03
Number of the ECTS credits		10
Language of instruction		English
Purpose and description of the content of education		The laboratory will be held at a partner Le Mans University in France or in the laboratories of the Institute of Physics. The student will be familiarized with modern research equipment and take part in experimental work. Under the guidance of the lecturer/supervisor of the realized project he/she will perform research, discuss, interprets and analyze the obtained results. The project will be implemented in a team, which will allow the student to be familiar with the specifics of team research. The subject of the laboratory/project may concern the synthesis and analysis also modelling of physical properties of nanostructures. The detailed research program depends on the topic of the realized project and is agreed with the Polish/French supervisor. Each class, in individual laboratories, will be preceded by a theoretical introduction regarding the tested properties of materials and applied research techniques (principle of operation, design of instruments, possibilities of application and measurement accuracy). The basis for getting credit will be preparing a report in English and presenting the obtained results to the research team as an examination board.
List of modules that must be completed before starting this module (if necessary)		not applicable

8.	Learning outcomes of the module			
	Code	Description	Learning outcomes of the programme	Level of competenc (scale 1-5)
	E1	has in-depth knowledge of experimental physics based on experience gained while taking measurements	KF_W02	4
	E2	enriched the knowledge of condensed phase physics and consolidated the knowledge of modern research methods	KF_W04	5
	E3	knows the mathematical formalism and mathematical methods useful in the construction and analysis of physical models with an average level of complexity; understands the consequences of using approximate methods and their impact on the interpretation of measurement results	KF_W06	4
	E4	knows the structure and principles of operation of selected scientific equipment; is able to choose the appropriate apparatus necessary to determine specific physico-chemical properties of materials	KF_W08	4
	E5	is able to plan and conduct various types of measurements and experiments with the use of specialized scientific equipment	KF_U05	4
	E6	is able to critically analyze and interpret measurement results, indicate the sources of measurement errors and formulate	KF_U07	3

	conclusions and relate them to the hypothesis		
E7	is able to independently develop and present the results of measurements in the form of a work containing: justification of the purpose of the work, the adopted methodology, description, analysis and discussion of the obtained results and their significance in comparison to similar studies	KF_U11	5
E8	has the ability to prepare and present an oral presentation in physics, using modern multimedia techniques; is able to take up a discussion and answer questions related to conducted research	KF_U15	4

9. Methods of conducting classes		
Code	Category	Name (description)
e08	Practical methods	Practice-as-research <i>also conducted as fieldwork; an activity aimed at confronting the acquired theory with practice through its practical application; students situate themselves in the reality they observe, study and transform through the prism of the theory; the method of practical classes is dominated by the application of knowledge to solving practical tasks</i>

10. Forms of teaching					
Code	Name	Number of hours	Assessment of the learning outcomes of the module	Learning outcomes of the module	Methods of conducting classes
FZ1	laboratory classes	100	course work	E1, E2, E3, E4, E5, E6, E7, E8	e08

11. The student's work, apart from participation in classes, includes in particular:			
Code	Category	Name (description)	Is it part of the BUNA?
a02	Preparation for classes	Literature reading / analysis of source materials <i>reading the literature indicated in the syllabus; reviewing, organizing, analyzing and selecting source materials to be used in class</i>	No
a03	Preparation for classes	Developing practical skills <i>activities involving the repetition, refinement and consolidation of practical skills, including those developed during previous classes or new skills necessary for the implementation of subsequent elements of the curriculum (as preparation for class participation)</i>	Yes
b01	Consulting the curriculum and the organization of classes	Getting acquainted with the syllabus content <i>reading through the syllabus and getting acquainted with its content</i>	No
c02	Preparation for verification of learning outcomes	Studying the literature used in and the materials produced in class <i>exploring the studied content, inquiring, considering, assimilating, interpreting it, or organizing knowledge obtained from the literature, documentation, instructions, scenarios, etc., used in class as well as from the notes or other materials/artifacts made in class</i>	Yes
c03	Preparation for verification of learning outcomes	Implementation of an individual or group assignment necessary for course/phase/ examination completion <i>a set of activities aimed at performing an assigned task, to be executed out of class, as an obligatory phase/element of the verification of the learning outcomes assigned to the course</i>	Yes
d01	Consulting the results of the verification of learning outcomes	Analysis of the corrective feedback provided by the academic teacher on the results of the verification of learning outcomes <i>reading through the academic teacher's comments, assessments and opinions on the implementation of the task aimed at checking the level of the achieved learning outcomes</i>	No

Information on the details of the module implementation in a given academic year can be found in the syllabus available in the USOS system: <https://usosweb.us.edu.pl>.